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CLAIM AMENDMENTS

1. (Currently Amended) A system for constraining the movement of a walker in a digital space with respect to some distinguished location in said space, comprising:

a pump software component associated with the distinguished location emitting a digital pheromone to generate a pheromone gradient, said pheromone having a rate of evaporation and a rate of propagation and

a walker software component operating in a grid system within the space and having a pheromone sensing threshold, said walker moving within the space to satisfy a preselected constraint with respect to said pump.

2. (Original) The system of claim 1 wherein the space is two-dimensional.

3. (Original) The system of claim 1 wherein the space is selected from the group consisting of: virtual, three-dimensional and multi-dimensional with a dimensionality of greater than 3.

4. (Original) The system of claim 1 further comprising a plurality of said pumps.

5. (Original) The system of claim 1 wherein said pheromone is emitted at a fixed strength.

6. (Original) The system of claim 1 wherein said pheromone is emitted at regular intervals.

7. (Original) The system of claim 1 wherein said pump is stationary.

8. (Original) The system of claim 1 wherein said pump is mobile within the space.

9. (Original) The system of claim 1 wherein the rate of propagation is the same in all directions.

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10. (Original) The system of claim 1 wherein the rate of propagation depends on a mesh of the grid system.

11. (Original) The system of claim 1 wherein the propagation is between 1 and 20 walker sensing steps.

12. (Original) The system of claim 1 wherein said grid system is selected from a group consisting of: trigonal, quadragonal, irregular, and hexagonal.

13. (Original) The system of claim 1 wherein the grid system is hexagonal.

14. (Original) The system of claim 1 wherein the preselected constraint relative to said pump is co-location.

15. (Original) The system of claim 1 wherein the preselected constraint relative to said pump is a spacing having a preselected pheromone concentration.

16. (Original) The system of claim 15 wherein the preselected pheromone concentration is above the pheromone sensing threshold of said walker.

17. (Original) The system of claim 15 wherein the preselected pheromone concentration is below the pheromone sensing threshold of said walker.

18. (Original) The system of claim 1 wherein said pump emits a plurality of pheromones, said plurality of pheromones having a plurality of rates of propagation and said walker senses each of said plurality of pheromones differently.

19. (Original) The system of claim 1 wherein said grid system is a multi-layer grid system.

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20. (Original) The system of claim 19 wherein the multi-layer grid system comprises layers that vary in relative mesh.

21. (Currently Amended) A process for constraining the movement of a walker software component in a digital space with respect to some distinguished location in said space, comprising the steps of:

emitting a digital pheromone from a pump to generate a pheromone gradient, wherein said pheromone has a rate of evaporation and rate of propagation; and

moving [[a]] said walker within the space in response to the pheromone gradient to satisfy a preselected constraint relative to said pump.

22. (Original) The process of claim 21 wherein the movement of said walker follows a polytopal grid system.

23. (Original) The process of claim 22 wherein the grid system is selected from a group consisting of trigonal, quadragonal, irregular, and hexagonal, .

24. (Original) The process of claim 23 wherein the grid system is hexagonal and a sum of said pheromone deposited in a grid system place that is reached from the pump's place p_0 in d steps and the shortest path of the grid system, t time units after emission is computed recursively as

$$q(d, t) = \frac{F}{6} \left(\frac{2d-1}{d-1} q(d-1, t-1) + \frac{2d+1}{d+1} q(d+1, t-1) + 2q(d, t-1) \right)$$

where F relates to the strength of the pheromone emission.

25. (Original) The process of claim 21 wherein the movement of said walker further comprises the step of determining a selection probability for moving a grid system unit adjacent to a walker place.

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26. (Original) The process of claim 25 wherein determining the selection probability further comprises the steps of:

sampling a concentration of said pheromone, s_i at each adjacent place p_i ; and

determining the relative attraction, f_i of an adjacent place normalized by an overall concentration of all places as given by the equation

$$f_i = s_i / \sum_{p_j \in C(p)} s_j$$

where $C(p)$ is the current place of said walker and the directly adjacent grid system units of said walker and j denotes all grid system units sampled.

27. (Original) The process of claim 21 wherein emission of a pheromone further comprises emitting a second pheromone having a second propagation distance that varies from the propagation distance of said pheromone.

28. (Original) The process of claim 21 wherein the preselected location of said walker relative to said pump is co-location.

29. (Original) The process of claim 21 wherein emission of said pheromone is from a plurality of pumps within the space.

30. (Original) The process of claim 21 wherein movement of said walker in the space is random until said walker senses said pheromone gradient.

31. (Original) The process of claim 27 wherein the movement of said walker is along a multi-layer grid system.

32. (Original) The process of claim 31 wherein said second pheromone is emitted differentially within the multi-layer grid system relative to said pheromone.

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33. (Original) The process of claim 31 further comprising the step of said walker following said second pheromone preferentially when remote from said pump and said pheromone preferentially when proximal to said pump.

34. (Currently Amended) A system for constraining the movement of a walker software component in a digital space with respect to some distinguished location in said space, comprising:

a pump software component;

a plurality of distance software agents created by said pump around a pump location, said plurality of distance agents depositing distance-pheromones having local concentrations forming a distance profile; and

a walker software component operating in a grid space of polytopes that samples the distance profiles to satisfy a preselected constraint relative to said pump.

35. (Original) The system of claim 34 wherein the space is two-dimensional.

36. (Original) The system of claim 34 wherein the space is selected from the group consisting of: virtual, three-dimensional and multi-dimensional with a dimensionality of greater than 3.

37. (Original) The system of claim 34 further comprising a plurality of said pumps.

38. (Original) The system of claim 34 wherein said pump is mobile within the space.

39. (Original) The system of claim 34 wherein the preselected constraint relative to said pump is co-location.

40. (Original) The system of claim 34 wherein said polygonal grid system is a multi-layer grid system.

41. - 55. (Canceled)